Annual benefits are $10 million to $15 million. CCWD is harmed in Alternatives 3A and 3B. Net cost of reduced water quality in Alternative 3B is $ 6 to 10 million annually

Costs of the CALFED storage and conveyance options are currently not available. Therefore, these costs have not been considered in terms of their effects on net benefits, nor have they been considered in terms of their effects on retail water prices or demand.

There is no accepted method to use for economic analysis of other water quality constituent at this time.

~~This~~ Cost information is important in evaluating environmental consequences because potential impacts on population, economic growth, and employment depend on the net benefit, not the gross benefit, of the alternatives. If the costs of CALFED supplies were substantially less than other supply options, the CALFED alternatives could have small positive effects on economic growth. If the costs of CALFED supplies were much more than other options, increased retail water costs could have small negative effects on economic growth and employment. Currently, it is believed that the costs of CALFED options will be similar to the costs of other supplies avoided. Therefore, no significant effects on economic growth, population, or employment, and no significant effects on the related natural and physical environment are anticipated.

3A, 3B

Salinity costs

Impacts on water quality are analyzed only for total dissolved solids (TDS). In this draft, ~~impacts~~ are analyzed ~~only~~ for Alternatives 1A, 1B, 1C, 2A, 2B, 2D, 2E and 3E; ~~and only for the service areas of Contra Costa Water District (CCWD) and Metropolitan Water District of Southern California that portion of the south coast region served by the State Water Project. Future analysis may include more export water users.~~ The analysis covers all M&I providers that use delta water except for providers served by the North Bay Aqueduct.

The analysis accounts only for differences in the quality of Delta source water caused by differences in Delta intake and conveyance configurations. The economic analysis ~~for Metropolitan and South Coast Region will~~ account for blending of ~~different~~ Delta water deliveries with ~~Colorado River~~ water. Differences in quality of source water caused by differences in export and storage amounts and in timing are not considered. ~~Metropolitan~~ The South Coast Region accounts for about ~~60~~ percent of M&I water demands included in the analysis.

other water supplies

Results suggest that source water quality for CCWD will be improved by all variations of Alternative 2. ~~except Alternative 2C. (Alternative 2C was not analyzed.) However, water quality is often in a range not considered to be economically important; therefore, water quality improvements would not be economically significant only in some most years.~~

insert #0

Results for ~~Metropolitan the South Coast Region~~ suggest that source water quality will be improved by all variations of Alternative 2 ~~(except Alternative 2C)~~ and by Alternative 3E. ~~Alternative 2C and The other variations of Alternative 3 were not analyzed.~~ ~~Metropolitan~~ The South Coast Region ~~also~~ obtains improved water quality for end users because of significantly increased Delta water supplies in Alternative 1C, 2B, 2E, and all of Alternative 3 except for Alternative 3A ~~and 3C. Economic analysis was not available for this draft, but improved end-user quality due to more and better quality source water should be economically significant in Alternatives 2 and 3E, 2E, and 2B, and possibly in additional alternatives.~~

especially substantially

and 3

Other SWP service areas

Based on the limited information available at this time, the ~~economic consequences~~ impacts of all ~~common~~ five programs — water use efficiency, water quality, levee system integrity, ecosystem restoration and water transfers — related to economics are not believed to be significant for any alternative. No adverse environmental effects have yet been identified, so no mitigation is required.

Annual Economic benefits to the Other SWP service areas range from a net cost of $ million in Alternative 1C, to a range of $100 to $150 million in Alternative 2, up to $200 million in Alternative 3E.

$8 to $2

Region	No Action	Alt 1			Alt 2				Alt 3				
		1a	1b	1c	2a	2b	2d	2e	3a	3b	3e	3h	3i
Delta (CCWD)				Supply (33)		Supply (33)	Supply (17)	Supply (33)	Supply 10	Supply (54)	Supply (54)	Supply (54)	Supply (54)
Bay				Supply (10)		Supply (10)		Supply (10)		Supply (33)	Supply (33)	Supply (33)	Supply (33)
Sacramento River				Supply (23)		Supply (23)		Supply (23)		Supply (46)	Supply (46)	Supply (46)	Supply (46)
San Joaquin River				Supply (12)		Supply (12)		Supply (12)		Supply (20)	Supply (20)	Supply (20)	Supply (20)
Other SWP Service Areas				Supply (15)	Quality	Supply (15) and quality	Quality	Supply (15) and quality		Supply (24)	Supply (24) and quality	Supply (24)	Supply (24)

NOTES:

Any ~~symbol~~ entry means that a significant effect has been identified. Supply = Water supply benefit, Cost = Water supply cost, Quality = Water quality benefit. The numeric entry after supply is the percent reduction in total drought costs. The lack of a symbol does not mean that the alternative will not have any impacts. Rather, it means that no decision has been reached, or information is not available.

Table 1. Significant Impacts by Region and Source, M&I Water Supply

therefore, a comprehensive analysis of costs and benefits is not possible.

Water quality of Delta water exports ~~for use in Metropolitan~~ is strongly affected by the configuration of Delta conveyance and export facilities. Also, ~~in Metropolitan the South Coast Region's~~ service area ~~salinity of delivered water~~ can be improved with more Delta water supplies because Delta water is blended with other, more saline supplies.

This technical report will include an economic analysis of salinity damages in ~~Metropolitan~~ delta export water users' service areas for some CALFED alternatives. The scope of this analysis will include service areas in which salinity of delta export water could have economically important effects.

~~DWRSIM results are used to estimate Delta water supplies for CALFED alternatives.~~ The water quality analysis must consider quality and quantity. DWRSIM Run 472 provides deliveries ~~to Metropolitan~~ for the CALFED No Action condition. To obtain deliveries for the other alternatives, the differences in total average delivery between Run 472 and the alternatives runs were calculated, and these differences were allocated to water users according to their share of CVP contracts plus SWP entitlements. ~~By this formula, Metropolitan~~ For example, the South Coast Region receives 60 percent of any incremental M&I water yield, or about 20 percent of all CALFED yield, that results from the CALFED alternatives. This yield increment is added to the No Action ~~Metropolitan~~ South Coast Region delivery from DWRSIM Run 472. Results are provided in Table 2 below.

DWR provided estimates of end-of-month salinity at Clifton Court Forebay ~~for~~ the water years 1976 to 1991 for Alternatives 1A, 1C, ~~2B~~, 2D, 2E, and 3E. Alternative 1A salinity is believed to be representative for Alternative 1B, and Alternative 2B salinity is believed to be representative for Alternative 2A. ~~Salinity results for Alternative 3A are forthcoming, and these runs should be representative for Alternatives 3B through 3D as well~~. All of these results are based on DWRSIM Run 472B hydrology, so monthly data on SWP exports under Run 472B hydrology at Banks Pumping Plant were obtained. Monthly salinities were multiplied by monthly exports, and the products were summed and divided by total delivery over the period to obtain flow-weighted salinity. Results ~~for the South Coast Region~~ are provided in Table 2 below.

In total, analysis is possible for Alternatives 1A, 1B, 1C, 2A, 2B, 2D, 2E, and 3E. Because deliveries and salinities for Alternatives 1A and 1B are identical, ~~seven~~ analyses are possible.

The salinity data account only for differences in salinity caused by the different geometry of Delta conveyance and intake configurations. Since the salinity data are all estimated from Run 472B hydrology, they do not account for any differences caused by different export amounts or storage configurations, or the timing of exports or storage releases. Therefore, economic results account for only part of the impacts of the alternatives on salinity and salinity damages. Unfortunately, it is not known whether salinity damages would be more or less if storage and export amounts and timing were accounted for.

Water quality costs of these changes in water supply and its salinity ~~will be~~ estimated using an economic model of salinity costs. The model is based on an earlier model of salinity damages for the entire lower Colorado River basin as discussed in *Estimating Economic Impacts*

C-004551

of Salinity of the Colorado River (Milliken Chapman Research Group, 1998).

3.3 Water Conservation

M&I providers are affected by the water conservation actions of others. They may finance other's water conservation actions, and others may participate in M&I water conservation in many ways. The CALFED Bay-Delta Program Water Use Efficiency Input Report 5-1 provides general and specific state-wide assumptions, estimates of urban water use, and preliminary estimates of existing and future urban water conservation efforts with and without the

Insert #1

Alternative	DWRSIM Run #	SCR Delivery	Clifton Court TDS[a]
No Action	472	1,597	269.02
1A, 1B	472	1,597	269.02
1C	510	1,707	281.43
2A	472B	1,632	180.55
2B	510	1,707	180.55
~~2C~~	~~472B~~	~~1,632~~	~~None available~~
2D	498	1,661	181.86
2E	510	1,707	177.75
3A, ~~3C~~	475	1,650	~~Forthcoming~~
3B, ~~3D~~	500	1,727	~~Forthcoming~~
3E	500	1,727	125.95
3F~~H~~ through 3I	500	1,727	None available

NOTE:

SCR = the South Coast Region

[a] All TDS estimates assume DWRSIM Run 472B hydrology.

Table 2 South Coast Region Delivery and Salinity Estimates Used for Salinity Damages Analysis

CALFED water conservation ~~common~~ program on a regional basis. Costs of these measures are forthcoming.

Water conservation benefits are primarily water cost savings that depend on supply levels, and economic savings may also include end-user energy cost and wastewater treatment cost savings. Conservation costs include program costs and end-user costs. Utilities pay the program costs of conservation programs. End-users pay some additional costs for compliance with mandatory and voluntary provisions (e.g., costs of water-saving devices, time, and inconvenience).

The assessment of M&I water conservation economics is qualitative because quantitative information on the costs of water conservation is not available. Future impact analysis will consider quantitative information on these variables. Costs will be provided, and techniques will be developed to estimate benefits associated with water conservation.

3.4 Relationships with M&I Land Use

This technical report is not concerned with M&I land use as it may be directly affected by the alternatives (e.g., if habitat restoration

Economic Parameter	Existing Conditions	No Action[c]	Alternative 1[c] 1a	1b	1c	Alternative 2[c] 2a	2b	2d	2e	Alternative 3[c] 3a	3b	3e	3h	3i
	Level ~~Impacts~~ by Alternative (millions of dollars per year)[a]													
CALFED water supply costs[d]	0	0	No costs available											
Other water supply costs[d]	0	1.3	1.3	1.3	-3.2	0	-3.2	-1.4	-3.2	0	-3.9	-3.9	-3.9	-3.9
Total average costs[d]														
Drought conservation costs[e]	5	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Drought make-up supply costs[e]	0	15.4	15.4	15.4	8.4	15.4	8.4	11.9	8.4	13.2	4.1	4.1	4.1	4.1
Total drought cost[e].	5	21.1	21.1	21.1	14.1	21.1	14.1	17.6	14.1	18.9	9.8	9.8	9.8	9.8
Water quality ~~costs~~[f] benefits	—	0	0	0	0.6	8	8	8	8	-1.9	-8.4	0.6	—	—
Water conservation costs														

13.4 13.4 13.2 13.9

NOTE:

CCWD impacts are used for water cost and water quality analysis.

[a] The lack of an entry does not mean that the impact is less than significant.

[b] Negative dollars in average years are cost savings from not needing available supplies.

[c] Under the 2020 development condition. Costs are additional costs to develop supplies or cost savings (-) from not needing available supplies.

[d] During a year of average delivery.

[e] During a year of the critical period (1928-1934). Assumes supplies are allocated evenly over the period. Drought conservation costs include net revenue loss, consumer surplus loss and conservation program costs.

[f] See text. ~~Significance calls relate only to differences in the configuration of Delta intake and conveyance facilities. An "S" denotes a probable benefit in some years.~~ Economic benefit relative to No Action Condition

Table 4. Summary of Impact Analysis for Delta Region

impacts of relocating Delta intake structures include minor water quality improvements and cost effects. Preliminary DWRSIM study results suggest using No Action Alternative deliveries for Alternative 1A as well. There may be a small water supply increase from Alternative 1A, but it has not yet been measured. ~~so there is no measured effect on water supply.~~ Preliminary water quality results are also the same as those provided for the No Action condition.

Alternative 1B would include South Delta modifications to allow export pumps to operate at their physical capacity. Preliminary DWRSIM study results suggest using No Action Alternative deliveries for Alternative 1B as well, so there is no measured effect on water supply. Preliminary water quality results are also the same as those provided for the No Action condition.

Storage

Alternative 1C would build on Alternative 1B by enlarging Delta channels and by adding new water storage facilities. Up to 5 MAF of storage would be added.

The amount and pattern of impacts from Alternative 1C will depend on how the new facilities are managed and operated, and how costs are allocated. New storage facilities may facilitate water transfers. Overall, Alternative 1C should have little effect on water supplies for most Delta M&I providers because most providers do not receive CVP or SWP supplies. Conveyance and storage impacts on Delta M&I providers involve construction and displacement effects, as well as water supply and water quality.

Preliminary DWRSIM modeling studies and assumptions involving the allocation of increased yield imply that CCWD would gain about 9,200 AF in average years and 11,700 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 5 percent and 6.5 percent of demand in average and dry years, respectively. The average year supplies are worth $4.5 million, and the additional supplies in dry years are worth an additional $7.1 million relative to the cost of other supplies.

DWR has provided preliminary analysis of TDS for Alternative 1C (DWR, 1997). The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. The average of 12 monthly 1976 to 1991 average TDS levels is 294 parts per million (ppm), not significantly different from the 300 ppm for the baseline condition.

insert #2 here

Alternative 2

Alternative 2 would utilize a modified system of through-Delta conveyance. Five variations of this configuration are considered that are made up of four conveyance and three storage options. All variations include the ~~Common~~ Programs, slightly modified to complement Alternative 2. Precise locations for many actions are not currently known, and names of locations are provided for example purposes only.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 2A would include the South Delta and CVP/SWP conveyance improvements as proposed for Alternative 1C. These measures would increase the diversion capacity of the existing export pumps to full capacity and provide additional operational flexibility. No new storage is included.

Preliminary DWRSIM modeling studies and assumptions involving yield allocation imply that CCWD would gain about 2,500 AF in average years and 1,300 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.4 percent and 0.7 percent of demand in average and dry years, respectively, The average year supplies are worth $1.3 million. The additional supplies in dry years are worth little relative to the cost of other supplies because they are almost 50 percent (1,300/2,500) reliable .

DWR has provided preliminary analysis of TDS for Alternative 2A. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. The average of 12 monthly 1976 to 1991 average TDS levels is 166 ppm, almost half of the 300 ppm for the baseline condition. ~~However, No Action salinity levels in many months are below levels generally considered to be economically damaging. Therefore, the difference in water quality due to differences in conveyance and intake configurations alone could be a significant beneficial impact, but only at some times.~~

~~Alternative 2C would provide three isolated South Delta conveyance facilities to deliver water to Clifton Court and the Tracy pumps. The three facilities would provide flexibility, depending on need and operating criteria. Also, in-Delta storage would be developed. The Levee System Common Program would be modified to accommodate the new isolated channels.~~

~~Preliminary DWRSIM modeling studies for Alternative 2C are the same as those for Alternative 2A; therefore, economic impacts are the same as those discussed for Alternative 2A. Currently, no water quality studies are available.~~

Storage

Alternative 2B would add up to 5.5 MAF of surface storage and 1 MAF of groundwater storage to Alternative 2A. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. Preliminary water quality benefits are the same as those discussed for Alternative 2A.

Alternative 2D would use a screened intake in the Sacramento River and a new channel for conveyance. Habitat improvements might be used to provide conveyance and habitat, South Delta modifications might provide new habitat and increase export capacity, and CVP/SWP improvements would improve operating flexibility. Up to 2.0 MAF of storage south of the Delta would be provided.

Preliminary DWRSIM modeling studies and yield allocation assumptions imply that CCWD would gain about 5,300 AF in average years and 6,100 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 3.0 and 3.4 percent of demand in average and dry years, respectively. The average year supplies are worth $2.7 million. The additional supplies in dry years are worth an additional $3.5 million relative to the cost of other supplies.

DWR has provided preliminary analysis of TDS for Alternative 2D. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. The average of 12 monthly 1976 to 1991 average TDS levels is 168 ppm, almost half of the 300 ppm for the baseline condition. ~~However,~~

salinity levels in many months are below levels generally considered to be economically damaging. Therefore, the difference in water quality due to differences in conveyance and intake configurations alone could be a significant beneficial impact, but only at some times.

Alternative 2E might develop Tyler Island aquatic habitat and the McCormack Williamson Tract for conveyance. Mokelumne River floodway and East Delta habitat improvements on the South Fork Mokelumne would provide conveyance and habitat, South Delta modifications would provide new habitat and increase export capacity, and CVP/SWP improvements would improve operating flexibility. Up to 5.5 MAF of surface storage and 1 MAF of groundwater storage would be provided. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C.

Preliminary water quality analysis of Alternative 2E is available. The average of 12 monthly 1976 to 1991 average TDS levels is 161 ppm, almost half of the 300 ppm for the baseline condition. However, salinity levels in many months are below levels generally considered to be economically damaging. Therefore, the difference in water quality due to differences in conveyance and intake configurations alone could be a significant beneficial impact, but only at some times.

Insert #3

Insert 3A

Alternative 3

This configuration would utilize through-Delta modifications and an isolated system for through-Delta conveyance for exported supplies. Combinations of seven potential conveyance configurations and two new storage configurations result in nine variations. Precise locations for many actions are not currently known, and names of locations are provided for example purposes only.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 3A would modify Alternative 2A by adding a 5,000-cubic-foot-per-second (cfs) isolated open facility, and Delta islands would not be flooded and used for conveyance as in Alternative 2A.

Preliminary DWRSIM modeling studies and yield allocation assumptions imply that CCWD would gain about 2,500 AF in average years and 3,500 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.4 percent and 2.0 percent of demand in average and dry years, respectively. The average year supplies are worth $1.3 million. The additional supplies in dry years are worth an additional $2.3 million relative to the cost of other supplies.

~~Alternative 3C would replace the open facility of Alternative 3A with a closed pipe. With this change, no additional effects relative to Alternative 3A are expected.~~

Storage

Alternative 3B would add 5.7 MAF of surface water storage and 1 MAF of groundwater storage to Alternative 3A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that CCWD would gain about 10,800 AF in average years and 17,600 AF in dry years. From the M&I water supply economic analysis, these gains would provide for

about 6.2 percent and 9.9 percent of demand in average and dry years, respectively. The average year supplies are worth $5.3 million. The additional supplies in dry years are worth $11.4 million relative to the cost of other supplies.

~~Alternative 3D would replace the open facility of Alternative 3B with a closed pipe. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~ Insert 3B

Alternative 3E would replace the 5,000-cfs isolated open conveyance facility of Alternative 3B with a 15,000-cfs facility, and the enlargement and barrier at the head of the Old River would be removed. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

~~DWR has provided preliminary analysis of TDS for Alternative 3E. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. The average of 12 monthly 1976 to 1991 average TDS levels is 294 ppm, not significantly different from the 300 ppm for the baseline condition.~~ Stet

~~Alternative 3F would provide cross-Delta conveyance by the chain of lakes concept. Up to 6.5 MAF of storage would be included. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B, except that a loss of municipal water demand in the Delta would result from the inundation of up to eight islands.~~

~~Alternative 3G would locate the 5,000-cfs open isolated conveyance facility in Alternative 3B to the current Sacramento Deep Ship Channel on the west side of the Sacramento River. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3H would modify Alternative 3B by adding habitat on the present Tyler Island, changing the location of other habitat, and reducing in-Delta storage by 200 TAF for a total of 5.5 MAF of storage. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Alternative 3I would modify Alternative 2C by adding an additional isolated intake (the northern 15,000-cfs isolated Sacramento River intake) and other new storage up to 6.5 MAF. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Insert #4

Economic Parameter	Level by Alternative (millions of dollars per year)													
	Existing Conditions	No Action	Alternative 1			Alternative 2				Alternative 3				
			1a	1b	1c	2a	2b	2d	2e	3a	3b	3e	3h	3i
CALFED water supply costs	0	0	No costs available											
Other water supply costs	-14.0	-8.4	-8.4	-8.4	-15.0	-10.6	-15.0	-12.3	-15.0	-11.7	-16.1	-16.1	-16.1	-16.1
Total average costs														
Drought conservation costs	42.6	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Drought make-up supply costs	0	176.6	176.6	176.6	156.9	177.1	156.9	166.9	156.9	173.1	143.5	143.5	143.5	143.5
Total drought costs	42.6	202.9	202.9	202.9	183.2	203.4	183.2	193.2	183.2	199.4	169.8	169.8	169.8	169.8
Water quality ~~costs~~ benefits		0	0	0	-2.1	~~$~~	~~$~~	~~$~~	~~$~~	9.9	11.0	~~D~~	–	–
Water conservation costs														

11.5 11.7 11.4 12.1 19.4

NOTE:
See notes from Table 4.

Table 5. Summary of Impact Analysis for the Bay Region (CCWD not included)

M&I Water Supply Economics
August 1997

Francisco Bay Area) are estimated to be ~~8,000 to 15,000~~ 135,000 to 150,000 AF.

Levee System Integrity

The nature and pattern of impacts are as described for Delta Region, Alternative 1. There is little potential impact except as levee failure might affect Delta export operations.

Conveyance

Because Alternative 1A would include no additional storage or conveyance, no substantial water supply benefits are expected. Alternative 1B would include South Delta modifications to allow export pumps to operate at their physical capacity. For Alternatives 1A and 1B, preliminary DWRSIM results suggest there will be no substantial change in water supply and water supply economics, and preliminary water quality analysis is the same as for the No Action condition.

Storage

Alternative 1C would build on Alternative 1B by enlarging Delta channels and by adding new water storage facilities. Up to 5 MAF of storage would be added. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Bay Region would gain about 21,000 AF in average years and 26,900 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 2.4 percent and 2.8 percent of demand in average and dry years, respectively. The average year supplies are worth $6.6 million annually in comparison to the costs of other supplies, and the additional supplies in dry years are worth an additional $19.8 million annually relative to the cost of other supplies.

DWR has provided preliminary analysis of TDS for Alternative 1C. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. Results, in terms of average salinity of exports from Clifton Court, are provided in Table 2. ~~There is little difference in salinity between Alternative 1C and No Action. Therefore, any potential economic effects are not significant.~~

insert #5 here

Alternative 2

The general description of Alternative 2 provided for the Delta Region is valid for the Bay Region as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 2A would include the South Delta and CVP/SWP conveyance improvements as proposed for Alternative 1C. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Bay Region would gain about 6,800 AF in average years and 3,000 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 0.8 percent of demand in average and 0.3 percent in dry years. The average year supplies are worth $2.2 million annually, but the additional CALFED supplies in dry years are worth little ($0.5 million) relative to the supplies they replace.

DWR has provided preliminary analysis of TDS for Alternative 2A. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology.

Results, in terms of average salinity of exports from Clifton Court, are summarized in Table 2. There is a significant difference in the TDS of exports between Alternative 2A and No Action. However, salinities are generally in a range considered to be economically unimportant for M&I users. At times, Alternative 2A might provide a noticable and economically significant economic improvement. Benefits would involve aesthetics, treatment costs, and, potentially, cost savings from reduced depreciation.

Alternative 2C would provide three isolated South Delta conveyance facilities to deliver water to Clifton Court and the Tracy pumps, and a small amount of in-Delta storage would be developed. Preliminary DWRSIM modeling studies for Alternative 2C are the same as those for Alternative 2A; therefore, economic impacts are the same as those discussed for Alternative 2A. No water quality analysis is available.

Storage

Alternative 2B would add up to 5.5 MAF of surface storage and 1 MAF of groundwater storage to Alternative 2A. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. Preliminary water quality benefits are the same as those discussed for Allternative 2A.

Alternative 2D would use a screened intake at Hood to divert water from the Sacramento River, a new channel for conveyance, and about 2 MAF of new storage south of the Delta. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Bay Region would gain about 12,100 AF in average years and 13,900 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.4 percent of demand in average and dry years. The average year supplies are worth $3.9 million annually, and the additional supplies in dry years are worth an additional $9.7 million relative to the cost of other supplies. Preliminary water quality analysis of water exported from Clifton Court is summarized in Table 2. Impacts are the same as those discussed for Alternative 2A.

Alternative 2E would develop new conveyance, and up to 5.5 MAF of surface storage and 1 MAF of groundwater storage would be provided. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. Preliminary water quality analysis of water exported from Clifton Court is summarized in Table 2. Impacts are the same as those discussed for Alternative 2A.

Insert #6

Alternative 3

The general description of Alternative 3 provided for the Delta Region is valid for the Bay Region as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 3A would modify Alternative 2A by adding a 5,000-cfs isolated open facility, and Delta islands would not be flooded and used for conveyance as in Alternative 2A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Bay Region would gain about 10,200 AF in average years and 7,900 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1 percent of demand in average and dry years. The average year supplies are worth $3.3 million annually, and the additional supplies in dry years are worth an additional $3.5 million relative to the cost of other supplies.

~~Alternative 3C would replace the open facility of Alternative 3A with a closed pipe. With this change, no additional effects relative to 3A are expected.~~

Storage

Alternative 3B would add 5.7 MAF of surface water storage and 1 MAF of groundwater storage to Alternative 3A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Bay Region would gain about 24,900 AF in average years and 40,300 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 2.9 percent and 4.2 percent of demand in average and dry years, respectively. The average year supplies are worth $7.7 million annually, and the additional supplies in dry years are worth an additional $33.1 million relative to the cost of other supplies.

~~Alternative 3D would replace the open facility of Alternative 3B with a closed pipe. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3E would replace the 5,000-cfs isolated open conveyance facility of Alternative 3B with a 15,000-cfs facility, and the enlargement and barrier at the head of the Old River would be removed. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B. Preliminary water quality analysis of water exported from Clifton Court is summarized in Table 2. The concentration of TDS in water exported from Clifton Court would be reduced by over one-half relative to the No Action Alternative. ~~No benefits have been quantified in dollar terms, but this is believed to be a significant benefit for~~ the ~~Bay Area in some years.~~

~~Alternative 3F would provide cross-Delta conveyance by the chain of lakes concept. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B, except that conveyance losses might be increased.~~

~~Alternative 3G would locate the 5,000-cfs open isolated conveyance facility in Alternative 3B to the current Sacramento Deep Ship Channel on the west side of the Sacramento River. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3H would modify Alternative 3B by changing the amount and location of habitat and reducing in-Delta storage by 200 TAF, for a total of 5.5 MAF of storage. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Alternative 3I would modify Alternative 2C by adding an additional isolated intake and other new storage up to 6.5 MAF. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Insert #7

5.2.3 Sacramento River Region

The impact analysis for the Sacramento River region is summarized in Table 6.

Alternative 1

The general description of Alternative 1 and the features of the each sub-alternative

Economic Parameter	Existing Conditions	No Action	Alternative 1			Alternative 2				Alternative 3				
			1a	1b	1c	2a	2b	2d	2e	3a	3b	3e	3h	3i
CALFED water supply costs	0	0	No costs available											
Other water supply costs	0	-1.7	-1.7	-1.7	-3.4	-2.2	-3.4	-2.6	-3.4	-2.5	-3.7	-3.7	-3.7	-3.7
Total average costs														
Drought conservation costs	0	7.0	7.0	7.0	6.6	7.0	6.6	6.8	6.6	7.0	6.4	6.4	6.4	6.4
Drought make-up supply costs	8.5	2.1	2.1	2.1	1.4	2.1	1.4	1.7	1.4	1.9	1.0	1.0	1.0	1.0
Total drought costs	8.5	9.1	9.1	9.1	8.0	9.1	8.0	8.5	8.0	8.9	7.4	7.4	7.4	7.4
Water quality benefits		0	0	0	-0.2	1.3	1.4	1.3	1.4	1.8	2.1	3.3		
Water conservation costs														

NOTE:
See notes from Table 4.

Table 7. Summary of Impact Analysis for the San Joaquin River Region

315 32C 237-240 250 243 193

C-004564

levels and goals. Potential real water savings from M&I uses due to CALFED Water Use Efficiency Actions for UR-2 (the Eastside San Joaquin River) and UR-3 (the Tulare Lake Region) are estimated to be 40,000 to 50,000 AF annually.

Levee System Integrity

The nature and pattern of impacts are as described for Delta Region, Alternative 1. There is little potential impact, except as levee failure might affect Delta export operations.

Conveyance

Because Alternative 1A would include no additional storage or conveyance, no substantial water supply benefits are expected. Alternative 1B would include South Delta modifications to allow export pumps to operate at their physical capacity. For Alternatives 1A and 1B, preliminary DWRSIM results suggest that there will be no substantial change in water supply ~~and water supply economies. Also, preliminary water quality anaysis from DWR suggests that there will be no significant change in water quality.~~

Storage

Alternative 1C would build on Alternative 1B by enlarging Delta channels and by adding new water storage facilities. Up to 5 MAF of storage would be added. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the San Joaquin River Region would gain about 9,400 AF in average years and 12,100 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.3 percent of demand in average years, and 1.7 percent of demand in dry years. The average year supplies are worth $1.7 million in comparison to the costs of other supplies, and the additional supplies in dry years are worth an additional $1.0 million annually relative to the cost of other supplies. Preliminary water quality analysis results reported in Table 2 are ~~Table 2 suggest that water quality changes will be minimal.~~

Insert #8

Alternative 2

The general description of Alternative 2 provided for the Delta Region is valid for the San Joaquin River Region as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 2A would include the South Delta and CVP/SWP conveyance improvements as proposed for Alternative 1C. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the San Joaquin River Region would gain about 3,000 AF in average years and 1,400 AF in dry years. From the M&I water supply economic analysis, these gains would provide for less than 0.5 percent of demand in average and dry years. The average year supplies are worth $0.6 million in comparison to the cost of other supplies, but the additional supplies in dry years have little additional value because the dry-year yield of the supplies replaced is about the same as the new CALFED supplies. ~~Analysis of water quality effects are the same as those shown for the Bay Area, Alternative 2A.~~

~~Alternative 2C would provide three isolated South Delta conveyance facilities to deliver~~

~~water to Clifton Court and the Tracy pumps, and a small amount of in-Delta storage would be developed. Preliminary DWRSIM modeling studies for Alternative 2C are the same as those for Alternative 2A; therefore, economic impacts are the same as those discussed for Alternative 2A.~~

Storage

Alternative 2B would add up to 5.5 MAF of surface storage and 1 MAF of groundwater storage to Alternative 2A. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. ~~Analysis of water quality economics is the same as shown for the Bay Area, Alternative 2B.~~

Alternative 2D would use a screened intake at Hood to divert water from the San Joaquin River, a new channel for conveyance, and about 2 MAF of new storage south of the Delta. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the San Joaquin River Region would gain about 5,400 AF in average years and 6,300 AF in dry years. These gains would provide for about 0.8 percent of demand in average years, and 0.9 percent of demand in dry years. The average year supplies are worth $1.0 million in comparison to the cost of other supplies. These supplies would have more value if they can be managed to meet demands in dry years. The additional supplies in dry years are worth an additional $0.5 million annually relative to the cost of other supplies. ~~Analysis of water quality economics is the same as shown for the Bay Area, Alternative 2D.~~

Alternative 2E would develop new conveyance, and up to 5.5 MAF of surface storage and 1 MAF of groundwater storage would be provided. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. ~~Analysis of water quality economics is the same as shown for the Bay Area, Alternative 2E.~~

Insert #9

Alternative 3

The general description of Alternative 3 provided for the Delta Region is valid for the Bay Region as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 3A would modify Alternative 2A by adding a 5,000-cfs isolated open facility, and Delta islands would not be flooded and used for conveyance as in Alternative 2A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the San Joaquin River Region would gain about 4,600 AF in average years and 3,600 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 0.5 percent of demand in average years, and 0.7 percent in dry years. The average year supplies are worth $0.8 million in comparison to the cost of other supplies. The additional supplies in dry years are worth an additional $0.2 million annually relative to the cost of other supplies.

~~Alternative 3C would replace the open facility of Alternative 3A with a closed pipe. With this change, no additional effects relative to Alternative 3A are expected.~~

Storage

Alternative 3B would add 5.7 MAF of surface water storage and 1 MAF of groundwater storage to Alternative 3A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the San Joaquin River Region would gain about 11,200 AF in average years and 18,100 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.6 and 3.8 percent of demands in average and dry years, respectively. The average year supplies are worth $2.0 million, and the additional supplies in dry years are worth an additional $1.8 million annually relative to the cost of other supplies.

~~Alternative 3D would replace the open facility of Alternative 3B with a closed pipe. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3E would replace the 5,000-cfs isolated open conveyance facility of Alternative 3B with a 15,000-cfs facility, and the enlargement and barrier at the head of the Old River would be removed. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B. ~~Analysis of water quality economics is the same as shown for the Bay Area, Alternative 3E.~~

~~Alternative 3F would provide cross-Delta conveyance by the chain of lakes concept. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B, except that conveyance losses might be increased.~~

~~Alternative 3G would locate the 5,000-cfs open isolated conveyance facility in Alternative 3B to the current Sacramento Deep Ship channel on the west side of the Sacramento River. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3H would modify Alternative 3B by changing the amount and location of habitat and reducing in-Delta storage by 200 TAF, for a total of 5.5 MAF of storage. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Alternative 3I would modify Alternative 2C by adding an additional isolated intake and other new storage up to 6.5 MAF. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Insert #10

5.2.5 Other SWP Service Areas

Table 8 provides a summary of the impact analysis for the Other SWP Service Areas.

Alternative 1

The general description of Alternative 1 and the features of the each sub-alternative provided for the Delta Region is valid for the Other SWP Service Areas as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for the Delta Region, Alternative 1. Any water quality improvements or other benefits would affect the Other SWP Service Areas through Delta exports only. Costs and cost shares are currently unknown.

Water Quality

There is no water quality program targeted to this region because the region's watersheds do not drain to the Bay or Delta. However, water quality improvements in the Delta would affect the Other SWP Service Areas through SWP exports. Costs and cost shares are currently unknown.

1C from 1 to 2 percent
$10.6

2A: 9 to 25%
$104.6 to
$116.0

3A 90.6 7 – 21%
3B 107.8 8 – 24%
3C 186.1 14 – 41%

Economic Parameter	Level by Alternative (millions of dollars per year)													
	Existing Conditions	No Action	Alternative 1			Alternative 2				Alternative 3				
			1a	1b	1c	2a	2b	2d	2e	3a	3b	3e	3h	3i
CALFED water supply costs	0	0	No costs available											
Other water supply costs	-91	601	601	601	466	556	466	521	466	534	442	442	442	442
Total average costs														
Drought conservation costs	63	310	310	310	310	310	310	310	310	310	310	310	310	310
Drought make-up supply costs	0	685	685	685	535	680	535	608	535	650	451	451	451	451
Total drought costs	63	995	995	995	845	990	845	918	845	960	761	761	761	761
Water quality ~~costs~~ benefits		0	0	0	~~P~~	~~P~~	~~P~~	~~P~~	~~P~~	90.6	107.8	~~P~~		
Water conservation costs														

NOTE:
See notes from Table 4.

−10.6 104.6 113.3 105.9 116.0 107.8 186.1

Table 8. Summary of Impact Analysis for Other SWP Service Areas

Water Use Efficiency

The nature and pattern of impacts are as described for the Delta Region, Alternative 1. Because the Other SWP Service Areas generally has a higher than average existing level of conservation, additional costs of conservation per unit of water saved may be higher than average. CALFED Water Use Efficiency Input Report ~~5-1~~ describes preliminary water conservation baseline levels and goals. Potential real water savings from M&I uses due to CALFED Water Use Efficiency Actions for UR-5 (the Central Coast), UR-6 (Southern California), and UR-7 (the Colorado River Region) are estimated to be ~~73,000 to 86,000~~ 525,000 to 575,000 AF annually.

Levee System Integrity

The nature and pattern of impacts are as described for Delta Region, Alternative 1. There is little potential impact, except as levee failure might affect Delta export operations. The economic cost of Delta export disruptions is inversely related to the amount of south-of-Delta storage, but this effect is judged too small to warrant a comparison across alternatives.

Conveyance

Because Alternative 1A would include no additional storage or conveyance, no water substantial supply benefits are expected. Alternative 1B would include South Delta modifications to allow export pumps to operate at their physical capacity. For Alternatives 1A and 1B, preliminary DWRSIM results suggest that there will be no substantial change in water supply and water supply economics. Preliminary water quality results also suggest no difference from No Action conditions.

Storage

Alternative 1C would build on Alternative 1B by enlarging Delta channels and by adding new water storage facilities. Up to 5 MAF of storage would be added.

Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Other SWP Service Areas would gain about 138,100 AF in average years and 176,700 AF in dry years. These gains would provide for about 2.4 percent of demand in average years and 4.5 percent of demand in dry years. The average year supplies are worth $135.4 million in comparison to the cost of other supplies. These supplies would have even more value if they can be managed to meet demands in dry years. The additional supplies in dry years are worth an additional $150.6 million annually relative to the cost of other supplies. These supply values would be less if water transfers from the Central Valley were allowed as a supply option.

DWR has provided preliminary analysis of TDS of export water for Alternative 1C. The salinity analysis does not consider differences in the amount of storage and in the amount and timing of exports between alternatives. Rather, only differences in conveyance and intake configurations are modeled using DWR Run 472B hydrology. Results, in terms of average salinity of exports from Clifton Court, are summarized in Table 2. ~~There is little difference in the TDS of exports between Alternative 1C and No Action, but the increase in deliveries results in increased dilution of lower-quality waters from other sources. Economic analysis is forthcoming.~~

Insert #11

Alternative 2

The general description of Alternative 2 provided for the Delta Region is valid for the Other SWP Service Areas as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

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Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 2A would include the South Delta and CVP/SWP conveyance improvements as proposed for Alternative 1C. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Other SWP Service Areas would gain about 44,600 AF in average years and 19,800 AF in dry years. These gains would provide for about 0.8 percent of demand in average years, and 0.3 percent in dry years. The average year supplies are worth $45.3 million in comparison to the cost of other supplies. These supplies would have more value if they can be managed to meet demands in dry years. The additional supplies in dry years have little additional value ($5.4 million) because the dry-year yield of the supplies replaced is about the same as the new CALFED supplies.

DWR has provided preliminary analysis of TDS of exports for Alternative 2A. Results, in terms of average salinity of exports from Clifton Court, are summarized in Table 2. ~~There is a significant difference in the TDS of exports between Alternative 2A and No Action, and the increase in deliveries results in increased dilution of lower-quality waters from other sources. Economic analysis is forthcoming.~~

~~Alternative 2C would provide three isolated South Delta conveyance facilities to deliver water to Clifton Court and the Tracy pumps, and a small amount of in-Delta storage would be developed. Preliminary DWRSIM modeling studies for Alternative 2C are the same as those for Alternative 2A; therefore, economic impacts are the same as those discussed for Alternative 2A.~~

Storage

Alternative 2B would add up to 5.5 MAF of surface storage and 1 MAF of groundwater storage to Alternative 2A. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C. ~~Economic analysis is forthcoming. Even without this analysis, it is believed that Alternative 2B will result in a significant economic benefit to the region from water quality improvement.~~

Alternative 2D would use a screened intake at Hood to divert water from the Other SWP Service Areas, a new channel for conveyance, and about 2 MAF of new storage south of the Delta. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Other SWP Service Areas would gain about 79,300 AF in average years and 91,700 AF in dry years. From the M&I water supply economic analysis, these gains would provide for about 1.4 percent of demand in average years and 1.5 percent of demand in dry years. The average year supplies are worth $79.5 million, and the additional supplies in dry years are worth an additional $77.3 million annually relative to the cost of other supplies.

DWR has provided preliminary analysis of TDS of exports for Alternative 2D. Results, in terms of average salinity of exports from Clifton Court, are summarized in Table 2. ~~There is a significant difference in the TDS of exports between Alternative 2D and No Action, and the increase in deliveries results in increased dilution of lower-quality waters from other sources. Economic analysis is forthcoming.~~

Alternative 2E would develop new conveyance, and up to 5.5 MAF of surface storage and 1 MAF of groundwater storage would be provided. Preliminary DWRSIM results and water supply benefits are the same as those discussed for Alternative 1C.

DWR has provided preliminary analysis of TDS of exports for Alternative 2E. Results, in terms of average salinity of exports from Clifton Court, are summarized in Table 2. ~~There is a significant difference in the TDS of exports between Alternative 2E and No Action, and the increase in deliveries results in increased dilution of lower-quality waters from other sources. Economic analysis is forthcoming. Even without this analysis, it is believed that Alternative 2E will result in a significant economic benefit to the region from water quality improvement.~~

Insert #12

Alternative 3

The general description of Alternative 3 provided for the Delta Region is valid for the Bay Region as well.

Ecosystem Restoration Program

The nature and pattern of impacts are as described for Alternative 1.

Water Quality

The nature and pattern of impacts are as described for Alternative 1.

Water Use Efficiency

The nature and pattern of impacts are as described for Alternative 1.

Levee System Integrity

The nature and pattern of impacts are as described for Alternative 1.

Conveyance

Alternative 3A would modify Alternative 2A by adding a 5,000-cfs isolated open facility, and Delta islands would not be flooded and used for conveyance as in Alternative 2A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Other SWP Service Areas would gain about 66,900 AF in average years and 52,100 AF in dry years. These gains would provide for about 1.2 percent of demand in average years, and 0.9 percent in dry years. The average year supplies are worth $67.4 million, and the additional supplies in dry years are worth an additional $35.3 million annually relative to the cost of other supplies.

~~Alternative 3C would replace the open facility of Alternative 3A with a closed pipe. With this change, no additional effects relative to 3A are expected.~~

Storage

Alternative 3B would add 5.7 MAF of surface water storage, and 1 MAF of groundwater storage to Alternative 3A. Preliminary DWRSIM modeling studies and yield allocation assumptions imply that the Other SWP Service Areas Region would gain about 163,600 AF in average years and 265,200 AF in dry years. These gains would provide for about 2.8 percent of demand in average years, and 4.4 percent in dry years. The Other SWP Service Areas Region in the 2020 average condition would require new water to meet demands, so the average year supplies are worth $158.8 million, and the additional supplies in dry years are worth an additional $234.6 million annually relative to the cost of other supplies.

~~Alternative 3D would replace the open facility of Alternative 3B with a closed pipe. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.~~

Alternative 3E would replace the 5,000-cfs isolated open conveyance facility of Alternative 3B with a 15,000-cfs facility, and the enlargement and barrier at the head of the Old River are removed. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

DWR has provided preliminary analysis of TDS of exports for Alternative 3E. Results, in terms of average salinity of exports from Clifton Court, were summarized in Table 2. ~~There is a significant difference in the TDS~~

of exports between Alternative 3E and No Action, and the increase in deliveries results in increased dilution of lower-quality waters from other sources. Economic analysis is forthcoming. Even without this analysis, it is believed that Alternative 3E will result in a significant economic benefit to the region from water quality improvement.

Alternative 3F would provide cross-Delta conveyance by the chain of lakes concept. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B, except that conveyance losses might be increased.

Alternative 3G would locate the 5,000-cfs open isolated conveyance facility in Alternative 3B to the current Sacramento Deep Ship channel on the west side of the Sacramento River. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Alternative 3H would modify Alternative 3B by changing the amount and location of habitat and reducing in-Delta storage by 200 TAF for a total of 5.5 MAF of storage. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Alternative 3I would modify Alternative 2C by adding an additional isolated intake and other new storage up to 6.5 MAF. No additional effects on M&I water use and costs are expected in comparison to Alternative 3B.

Insert #13

5.3 Summary of Comparisons by Region

Economic impacts of the Ecosystem Restoration, Water Quality, Water Use Efficiency, Water Transfers and Levee System Integrity ~~Common~~ Programs have not been quantified, primarily for lack of information on the magnitude of physical impacts and cost sharing.

Impacts of water storage and water conveyance components are summarized by region in Tables 9 through 16. All of the analysis on which these tables are based is preliminary and subject to change. However, some trends are readily apparent. Based on reductions in drought water supply costs, Alternatives 1C 2B, 2E, and 3B through 3I all have a significant influence on water supply for all regions. CCWD is entirely dependent on Delta export water for its supplies, so Alternatives 2D and 3A are also significant in the Delta region. Salinity of water is a problem in the South Coast Region, so reduced salinity of export water is a significant benefit there.

6.0 References Cited

Bass, Ronald E., Albert I. Herson, and Kenneth M. Bogdan, 1996. "CEQA Deskbook." Solano Press Books, Point Arena.

CALFED Bay-Delta Program, 1996. Initial Draft Impact Significance Thresholds Criteria. Draft Report. August 27

DWR Modeling Support Branch, Delta Modeling Section. 1997. Progress Report. Delta Simulation Model Studies of CALFED Alternatives 1A, 1C, 2B, 2D, 2E, and 3E. June 15.

Milliken Chapman Research Group, Inc., 1998. Estimating Economic Impacts of Salinity of the Colorado River. February.

For water users who take export water from Clifton Court Alternative 1C increases salinity and increases salinity costs. All M&I water users considered benefit from Alternative 2. Total annual benefits ~~are~~ range from $100 to $150 million annually. Benefits in Alternative 3 range from $100 million in 3A to $208 million in 3C. Salinity for CCWD is increased in Alternative 3B,

Alternative	CALFED Water Conveyance Costs	Other Water Supply Costs	Water Quality Costs[a]	Water Conservation Costs
Existing Conditions	None	Many sunk costs, some excess capacity.	Conveyance capacity limits ability to move water when quality is better.	Increasing.
No Action Alternative	None	Increased demand may require more capacity, increasing costs.	Less excess capacity in 2020 means less ability to move water when quality is better.	Conservation may help relieve capacity constraints.
Alternative 1	Unknown	No substantial changes to conveyance and no quantifiable effect on supplies.	~~No quantifiable effect on water quality.~~ insert (1)	Without supply increase, no interaction between conveyance and conservation.
Alternative 2	Unknown	Changes to conveyance have little quantifiable effect on water supplies.	~~Significant improvement in source water quality in some years, effect of Alternative 2C is unknown.~~ insert (2)	Without supply increase, no interaction between conveyance and conservation.
Alternative 3	Unknown	Isolated facility increases water supply, but effect not considered significant.	~~Significant source water quality improvements not likely for Alternative 3E, others are unknown.~~ insert (3)	Without significant supply increase, no interaction between conveyance and conservation.

[a] Water quality analysis considered effects of different intake and conveyance configurations without analysis of interactions with storage or export amounts, or timing.

Table 10. Generalized Impacts of Alternatives on M&I Water Costs for the Delta Region—Water Conveyance

(1) Alternative 1C reduces water quality costs by less than $1 million annually

(2) water quality benefit of $10 million to $15 million annually

(3) Alternatives 3A and 3B impair water quality at a costs of $1.8 and $8.4 million, respectively

Alternative	CALFED Water Conveyance Costs	Other Water Supply Costs	Water Quality Costs[a]	Water Conservation Costs
Existing Conditions	None	Many sunk costs, some excess capacity.	Conveyance capacity limits ability to move water when quality is better.	Increasing.
No Action Alternative	None	Increased demand may strain conveyance capacity into the region.	Less excess capacity in 2020 means less ability to move water when quality is better.	Additional conservation may reduce capacity pressures.
Alternative 1	Unknown	No substantial changes to conveyance and no quantifiable effect on supplies.	~~No quantifiable effect on water quality.~~ insert (4)	Without supply increase, no interaction between conveyance and conservation.
Alternative 2	Unknown	Changes to conveyance have little quantifiable effect on water supplies.	~~Significant improvement in source water quality in some years, effect of Alternative 2C is unknown.~~ insert (5)	Without supply increase, no interaction between conveyance and conservation.
Alternative 3	Unknown	Isolated facility increases water supply, but effect not considered significant.	~~Significant source water quality improvements likely for Alternative 3E, others are unknown.~~ insert (6)	Without significant supply increase, no interaction between conveyance and conservation.

[a] Water quality analysis considered effects of different intake and conveyance configurations without analysis of interactions with storage or export amounts, or timing.

Table 12. Generalized Impacts of Alternatives on M&I Water Costs for the Bay Region—Water Conveyance

(4) Alternative 1C increases water quality costs by $2.1 million annually.

(5) Annual benefit from improved water quality is $10 million to $15 million annually.

(6) Annual benefit from improved water quality ranges from $10 million in Alternative 3A to $20 million in Alternative 3B

Alternative	CALFED Water Conveyance Costs	Other Water Supply Costs	Water Quality Costs[a]	Water Conservation Costs
Existing Conditions	None	Many sunk costs, some excess capacity.	Conveyance capacity limits ability to move water when quality is better.	Increasing.
No Action Alternative	None	Increased demand increases peak deliveries.	Less excess capacity in 2020 means less ability to move water when quality is better.	Little interaction between conservation and conveyance.
Alternative 1	Unknown	No substantial changes to conveyance and no quantifiable effect on supplies.	~~No quantifiable effect on water quality.~~ insert (6)	Without supply increase, no interaction between conveyance and conservation.
Alternative 2	Unknown	Changes to conveyance have little quantifiable effect on water supplies.	~~Significant improvement in source water quality in some years, effect of Alt 2C unknown.~~ insert (8)	Without supply increase, no interaction between conveyance and conservation.
Alternative 3	Unknown	Isolated facility increases water supply, but effect not considered significant.	~~Significant source water quality improvements likely for Alternative 3E, others unknown.~~ insert (9)	Without significant supply increase, no interaction between conveyance and conservation.

[a] Water quality analysis considered effects of different intake and conveyance configurations without analysis of interactions with storage or export amounts, or timing.

Table 16. Generalized Impacts of Alternatives on M&I Water Costs for the San Joaquin River Region—Water Conveyance

(7) Alternative 1C increases water quality costs by $0.2 million annually.

(8) Annual benefit from improved water quality is $1.0 to $1.5 million annually.

(9) Annual benefit from improved water quality ranges from $1.2 million in Alternative 3A to $2.2 million in Alternative 3E.

Alternative	CALFED Water Conveyance Costs	Other Water Supply Costs	Water Quality Costs[a]	Water Conservation Costs
Existing Conditions	None	Many sunk costs, some excess capacity.	Conveyance capacity limits ability to move water when quality is better.	Increasing, assume Level 1.
No Action Alternative	None	Less excess capacity, especially from Colorado River system.	Less excess capacity in 2020 means less ability to move water when quality is better.	Little interaction between conservation and conveyance.
Alternative 1	Unknown	No substantial changes to conveyance and no quantifiable effect on supplies.	~~No quantifiable effect on water quality.~~ insert (10)	Without supply increase, no interaction between conveyance and conservation.
Alternative 2	Unknown	Changes to conveyance have little quantifiable effect on water supplies.	~~Significant improvement in source water quality in some years.~~ insert (11)	Without supply increase, no interaction between conveyance and conservation.
Alternative 3	Unknown	Isolated facility increases water supply, but effect not considered significant.	~~Significant source water quality improvements are likely for Alternative 3E, others are unknown.~~ insert (12)	Without significant supply increase, no interaction between conveyance and conservation.

[a] Water quality analysis considered effects of different intake and conveyance configurations without analysis of interactions with storage or export amounts, or timing.

Table 18. Generalized Impacts of Alternatives on M&I Water Costs for Other SWP Service Areas—Water Conveyance

(10) Alternative 1C increases water quality costs by $12.7 annually.

(11) Annual benefit from improved water quality is $100 to $150 million annually

(12) Annual benefit from improved water quality ~~is~~ ranges from $90 million (Alternative 3A) to $200 million (Alternative 3E)